

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : John Skoufis
 Serial No. : 09/879,613
 Filed : 06/12/2001
 For : PEROXIDE PRESERVATION
 Group Art Unit : 3728
 Examiner : Mohandes, Jila M.

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BOARD OF PATENT APPEALS
AND INTERFERENCES

Board of Appeals and Interferences
 Director for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

Sir:

This is an Appeal from the final rejection of Claims 1, 3-5, 9 and 12 in the above-identified patent application.

This Brief is submitted in triplicate, as required by 37 C.F.R. § 1.192(a).

This Brief is accompanied by a Petition for Extension of Time.

Please charge the \$500.00 Appeal Brief Fee to Deposit Account No. 50-0540. Please charge any deficiency or credit any over payment to Deposit Account No. 50-0540.

REAL PARTY IN INTEREST

The real party in interest is Illinois Tool Works, Inc., the Assignee of this patent application.

RELATED APPEALS AND INTERFERENCES

Appellants is not aware of any related appeals or interferences which directly affect, or are directly affected by, or have a bearing on the Board's decision in this appeal.

STATUS OF AMENDMENTS

All amendments have been entered.

STATUS OF CLAIMS

Claims 1, 3-5, 9 and 12, all of the pending claims, have been finally rejected as being unpatentable, under 35 U.S.C. §103(a), over Onodera 6,012,576 in view of Paley et al. 5,988,371.

SUMMARY OF THE INVENTION

This invention provides a method of packaging extremely clean PVA sponge brushes. Such brushes are used to scrub semiconductor Wafers from which semiconductor devices are made. The invention also provides ultra-clean PVA sponges made by use of the method.

The cleanliness requirements for PVA (polyvinyl alcohol) sponges used in semiconductor manufacturing are very stringent. Such sponges must have very, very low levels of impurities. These impurities include metal ions, anionic materials such as chlorides, fluorides, phosphates and bromides, and particulates.

In the manufacture of semiconductor devices, objectionable particulates even include bacteria, which often are of the same order of magnitude in size as the spacings between conductors in such devices.

To ensure that the products are clean enough to meet such stringent requirements, they are washed by the manufacturer using very strictly-controlled and very special washing procedures, and then packaged in sealed containers before shipment to the customers.

The sponges are shipped in sealed containers with water to keep the sponges wet, so as to prevent them from drying out and thereby becoming unusable.

Since the sponges may be required to stay in their packages for many months before they are used, the growth of bacteria in the packages must be prevented; otherwise, the bacteria will contaminate the sponges and make them useless.

Various methods have been used or proposed for preventing such bacteria growth, such as the use of e-beam or gamma

radiation, and the addition of various chemicals to the liquids wetting the sponges.

The problem recognized by the inventor is that chemical additives themselves often are impurities or develop metallic ions if they remain in the package until it is opened. This is a difficult problem which this invention solves in a clever and inexpensive way.

The invention uses a very low concentration of hydrogen peroxide in de-ionized water in the package as a bactericide. The concentration level is well below the levels suggested for use in the past.

The concentration is high enough to kill bacteria when the cleaning article is first put into the package, but so low that it is ensured that the hydrogen peroxide will decompose into its components, water and oxygen, shortly after the package has been sealed.

The result is that the hydrogen peroxide does not remain in contact with the sponge over a long period of time and thus cannot develop metallic ions as impurities. Furthermore, when the package is opened, the hydrogen peroxide is gone and thus cannot constitute a contaminant. The result is a cleaner sponge, with neither bacteria nor hydrogen peroxide.¹

¹ Specification, page 4 last paragraph, and page 5, first two paragraphs.

The use of such low concentrations of hydrogen peroxide is contrary to the teachings of the prior art and produces a new and highly advantageous result which has not been predicted by those skilled in the art.

CLAIM GROUPINGS

The pending claims are set forth in the Appendix.

Following are the groupings of the claims.

- A. Claims 1 and 3 stand or fall together.
- B. Claims 4 and 5 do not stand or fall together or with any other claims.
- C. Claims 9 and 12 stand or fall together.

ISSUES

The only issue on Appeal is whether Claims 1, 3-5 and 9 and 12 are patentable under 35 U.S.C. §103 over Onodera 6,012,576, in view of Paley et al. 5,988,371.

THE CLAIMS

Claims 1 and 3-5 are method claims. Claim 1 is set forth below:

1. A method of packaging a PVA sponge for use in scrubbing semiconductor wafers, said method comprising:
 - (a) placing said sponge in a flexible plastic bag;
 - (b) said sponge containing a quantity of de-ionized water with around 0.05% to around 0.5% by volume of hydrogen peroxide; and
 - (c) sealing said bag.

Claims 9 and 12 are claims to the packaged product. Claim 9 is set forth below:

9. A packaged PVA sponge for use in clean rooms, said cleaning article having particulate, metal ion and anionic counts at or below the values specified for a clean room, said package comprising a sealed flexible plastic bag, said sponge being positioned in said bag, and containing a quantity of de-ionized water, said de-ionized water containing hydrogen peroxide in a concentration effective to kill and retard the growth of bacteria in said sponge, said amount being low enough to substantially ensure decomposition of said hydrogen peroxide in a relatively short period of time after the container is sealed and being between 0.05% and 0.5% by volume.

Each of the six claims on appeal calls for a PVA sponge and a quantity of de-ionized water with around 0.05% to around 0.5% by volume of hydrogen peroxide, in a plastic bag.

THE REJECTION

The Examiner relies on a combination of Onodera 6,102,576 and Paley et al. 5,988,371 in rejecting the claims for obviousness.

Neither reference discloses the concept of using very low concentrations of hydrogen peroxide to ensure rapid decomposition of the hydrogen peroxide and thus prevent it from being a source of impurities.

In fact, neither reference shows or suggests the use of such low concentrations for any purpose.

Onodera discloses a method for storing a sponge brush by removing the brush from the scrubbing apparatus using it and placing the brush in a container containing a bactericidal liquid such as an aqueous solution of 1% to 5% hydrogen peroxide, or sodium hypochlorite, or formalin, or water with ethyl or isopropyl alcohol. (Column 3, lines 8-11).

In the Final Rejection dated December 3, 2004, on page 2, the Examiner contends that Onodera '576:

"discloses all of the limitations of the claims except for the container to be a flexible plastic bag and the specific degree of range of the hydrogen peroxide."

The Examiner argued that Paley '371 discloses storing a cleaning article in a flexible bag which can be opened and resealed for future use and can be easily shipped and handled. Therefore, it would have been obvious to modify Onodera as taught by Paley.

Specifically, although admitting that Onodera does not disclose the range of concentrations of hydrogen peroxide set forth in the claims, the Examiner argued that this is obvious because:

"discovering the optimum or workable ranges involves only routine skill in the art."²

The Examiner's position is in error.

² Final Rejection, page 2, second full paragraph.

THE REFERENCESA. ONODERA

First, the Examiner incorrectly asserts that Onodera discloses a concentration of hydrogen peroxide low enough to ensure fast decomposition,³ and cites Column 3, lines 1-11 of the patent to support this interpretation.

Column 3, lines 1-11 of Onodera are quoted below in their entirety (with lines 66-67 of Column 2, for the sake of completeness) :

"For example, the brush 5 can be stored in the shell 2 without becoming dry by putting the brush 5, whose member 8 is soaked with water, into the shell 2 and, tightly sealing the shell 2 with the top 3. In this case, the shell 2 may be filled with water 6. In addition, when the shell 2 is filled with a bactericidal liquid or a liquid that prevents multiplication of bacteria, instead of water, it is possible to prevent bacterial contamination when the brush is to be stored for a very long time, such as a few months or about half a year. Examples of bactericidal liquids include an aqueous solution of 1 to 5% hydrogen peroxide, an aqueous solution of sodium hypochlorite or formalin, or water with ethyl alcohol or isopropyl alcohol added thereto. Another effective way to ..." [Emphasis added]

There is no statement in that passage which would support the Examiner's contention.

Onodera says nothing in that passage or anywhere about wanting the hydrogen peroxide to decompose. In fact, Onodera

strongly implies that the hydrogen peroxide should remain effective as a bactericide for a "very long time", such as a few months to about half a year. Thus, Onodera teaches one to use more bactericide to ensure that the bactericidal effect last long enough.

The teaching that the bactericide should retain its effectiveness for a long time also is found in Column 3, lines 14-18:

"The most preferable method to prevent [sic] bacterial contamination is to heat the brush 5 along with the shell 2 and the top 3 in order to kill off any bacteria, and then storing the brush 5 in a bactericidal liquid."

There would be no purpose in adding the bactericide after using heat to kill the bacteria unless it were done for the purpose of preventing the multiplication of bacteria for as long as the sponge is stored in the container -- for up to six months.

Again, in Column 4, lines 54-57, Onodera states:

"According to the present invention, a brush formed by a sponge-like member or fibrous member is stored in a container for a few months to a half a year while it is in a wet state."

Onodera then continues, in Column 4, lines 58-62:

"If necessary, in order to kill off any bacteria the brush and the container storing the brush are heated, or the brush is dipped into a

³ Page 2, lines 10-12 of the Final Rejection

bactericidal liquid filled in a closed container and stored therein."

Onodera concludes by saying, in Column 4, lines 63-65:

"In addition, the brush stored in the container will not be contaminated by multiplication of bacteria."

Thus, Onodera clearly teaches that the bactericide should remain effective for the full time of storage of the sponge, and that a concentration of 1% to 5% hydrogen peroxide will do just that.

Therefore, not only does Onodera fail to teach the deliberate use of low concentrations to ensure rapid decomposition of the hydrogen peroxide, but Onodera actually teaches the opposite; make sure you use enough to retain the bactericidal effect for the full time of storage.

B. PALEY ET AL.

Paley et al, the secondary reference which is cited to show the use of plastic bags as containers, supports the above interpretation of Onodera.

Paley discloses packaging for clean-room wipers in which a cleaning liquid is stored in a sealed plastic pouch resting atop the dry wipers, both being enclosed by a sealed larger plastic bag. The liquid is prevented from contacting the wipers until the pouch is punctured to release the liquid into the wipers just prior to their use. This prevents deterioration due to

contact of the wipers by the liquid during a possibly long time while the package is stored on the shelf before use.

The outer bag can be opened and resealed by an adhesive flap, as shown in Figure 2, allowing removal of wet wipers from the outer bag and then re-sealing of the bag.

In Column 10, lines 12-19, the use of de-ionized water as a cleaning fluid is described. It is stated that a bactericide can be used in the water, but that its effectiveness is reduced by prolonged contact with the wipers, and that the bactericide may introduce contaminants into the wipers.

Paley's solution is to keep the bactericide-containing water from contacting the wipers until just prior to their use. Thus, Paley teaches the need to maintain the effectiveness of the bactericide for a long time, and to prevent deterioration of the bactericide over time.

Therefore, the only prior art of record consistently teaches the need to maintain the effectiveness of bactericides over time, and thus teaches away from the invention.

Deliberately ensuring rapid decomposition of the hydrogen peroxide is counter-intuitive and unobvious.

OTHER LIMITATIONS

The Examiner also erroneously contends that other limitations of the claims are disclosed by Onodera.

Each of the claims calls for the use of de-ionized water with hydrogen peroxide. The Examiner contends that Onodera shows the use of de-ionized water,⁴ but does not cite any location in the patent at which it is shown.

Actually, only "water" is described (see Column 3, lines 1, 3 and 10). De-ionized water is not mentioned.

Claim 9 specifies that the sponge has "particulate, metal ion and anionic counts at or below the values specified for a clean room". These values are required for new sponges but might not be required for sponges such as those stored by Onodera, in which the sponges are stored after use in scrubbing wafers. In any event, the Examiner is incorrect in stating that Onodera discloses such a sponge.

ARGUMENT

The Examiner relies on In Re Aller, 105 U.S.P.Q. 233 (CCPA, 1955) for the statement that:

"... since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art."

Thus, the Examiner contends that Applicant has done nothing more than discover the optimum or workable ranges of concentrations for hydrogen peroxide.

⁴ See: Final Rejection, page 2, paragraph 2, line 7.

This is not correct because Applicant's invention has created a new result; the deliberate rapid decomposition of the bactericide. This produces a sponge which is bacteria-free without any hydrogen peroxide as a contaminant, and without the metallic ions which can be caused by prolonged contact between the hydrogen peroxide and the sponge.

In the Aller case, there was no such new result. The Applicant merely claimed greater efficiency or yield from the prior art process by specifying specific process temperature and sulfuric acid concentration ranges somewhat different from those disclosed by the prior art. The CCPA characterized the differences a merely differences of degree rather than differences of kind. (105 PQ 235-236)

Here, there is a difference in kind, in that the low ranges produce deliberate rapid decomposition of the hydrogen peroxide, with attendant unexpected advantages of removing two further sources of contamination beyond the bacteria.

The Aller ruling is inapplicable to this case for the further reason that its holding is based upon the old "obvious to try" test, which has been held to be improper in a long line of Federal Circuit Court decisions decided much more recently than 1955, when the Aller case was decided.

The CCPA ruled, in essence, that it would have been obvious to try other values, when it stated (105 PQ 237):

"The skilled chemist who chose to experiment with the reference process would undoubtedly try the conditions defined by the claims, although he might be surprised at the extent of improvement obtained. No invention is involved in the discovering optimum ranges of a process by routine experimentation. In re Swain et al., *supra*."

Typical of the numerous decisions by the CAFC discrediting the "obvious to try" test is the case of Gillette v. S.C. Johnson Son Inc., 16 USPQ.2D 1923 (Fed. Cir. 1990).

In that case, the defendants' argument that it would have been "obvious to try" and to thus obtain the invention was not a correct test for obviousness (16 USPQ.2d at 1928).

Instead, the Court ruled, the analysis of the invention must include consideration of the results obtained by the invention (16 PQ.2d 1928).

"Critical to the analysis is an understanding of the particular results achieved by the new combination."

The superior properties of the invention supported the finding of unobviousness.

Here, the analysis specified by the Gillette case shows that the new result of the very low range claimed, namely, the deliberate rapid decomposition of the bactericide, produces the

highly beneficial reductions of contaminant sources, well beyond the mere extermination of bacteria. These results are not predicted by the prior art, and are unexpected. The invention is unobvious.

The invention is unobvious for the further reason that the prior art teaches away from the invention.

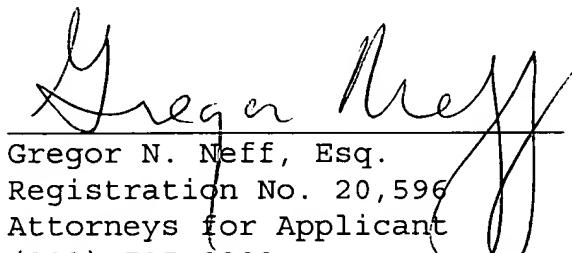
As it has been discussed above, the prior art clearly teaches that a bactericide should remain effective for very long periods of time. This is totally contrary to the concept of deliberately decomposing the bactericide.

For the foregoing reasons, the invention is unobvious and the claims should be allowed.

Respectfully submitted,

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APPENDIXA. Claims On Appeal

1. A method of packaging a PVA sponge for use in scrubbing semiconductor wafers, said method comprising:

- (a) placing said sponge in a flexible plastic bag;
- (b) said sponge containing a quantity of de-ionized water with around 0.05% to around 0.5% by volume of hydrogen peroxide; and
- (c) sealing said bag.

3. A method as in Claim 1 in which said quantity of de-ionized water with hydrogen peroxide is between an amount sufficient to wet said sponge and an amount necessary to saturate said sponge.

4. A method as in Claim 1 in which the volume of hydrogen peroxide is around 0.1%.

5. A method of packaging a PVA sponge brush, said method comprising placing said cleaning article in a plastic bag, said sponge brush containing a quantity of de-ionized water, said water containing hydrogen peroxide in an amount effective to kill and retard the growth of bacteria in said cleaning article but less than an amount sufficient to develop significant quantities of metallic ions in said container, and

sealing said container, in which said amount of hydrogen peroxide is about 0.05% to around 0.5% by volume.

9. A packaged PVA sponge for use in clean rooms, said cleaning article having particulate, metal ion and anionic counts at or below the values specified for a clean room, said package comprising a sealed flexible plastic bag, said sponge being positioned in said bag, and containing a quantity of de-ionized water, said de-ionized water containing hydrogen peroxide in a concentration effective to kill and retard the growth of bacteria in said sponge, said amount being low enough to substantially ensure decomposition of said hydrogen peroxide in a relatively short period of time after the container is sealed and being between 0.05% and 0.5% by volume.

12. A cleaning article as in Claim 9 in which said cleaning article is a PVA sponge for scrubbing semiconductor wafer surfaces, and said concentration of hydrogen peroxide is around 0.1 percent by volume.

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Javon Frieson

(Typed or printed name of person mailing paper or fee)

Javon Frieson

(Signature of person mailing paper or fee)

TRANSMITTAL OF APPEAL BRIEF

Board of Appeals and Interferences
Director for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith in triplicate is Appellants' Brief in support of their Appeal in the above-identified application and a Request for Extension of Term to extend the due date for filing the Brief to August 5, 2005.

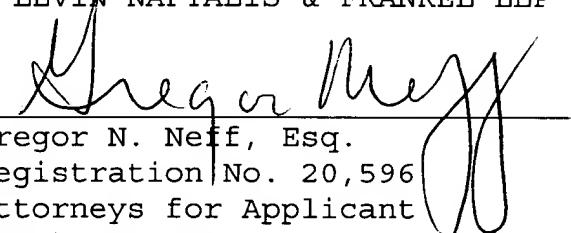
Please charge the amount of \$500.00 in payment of the required Appeal fee set forth in 367 C.F.R. § 1.17(c), and the amount of \$1,020.00 in payment of the fee for extension of the term as required by 37 C.F.R. § 1.17(a) to Applicant's Deposit Account No. 50-0540.

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Respectfully submitted,

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